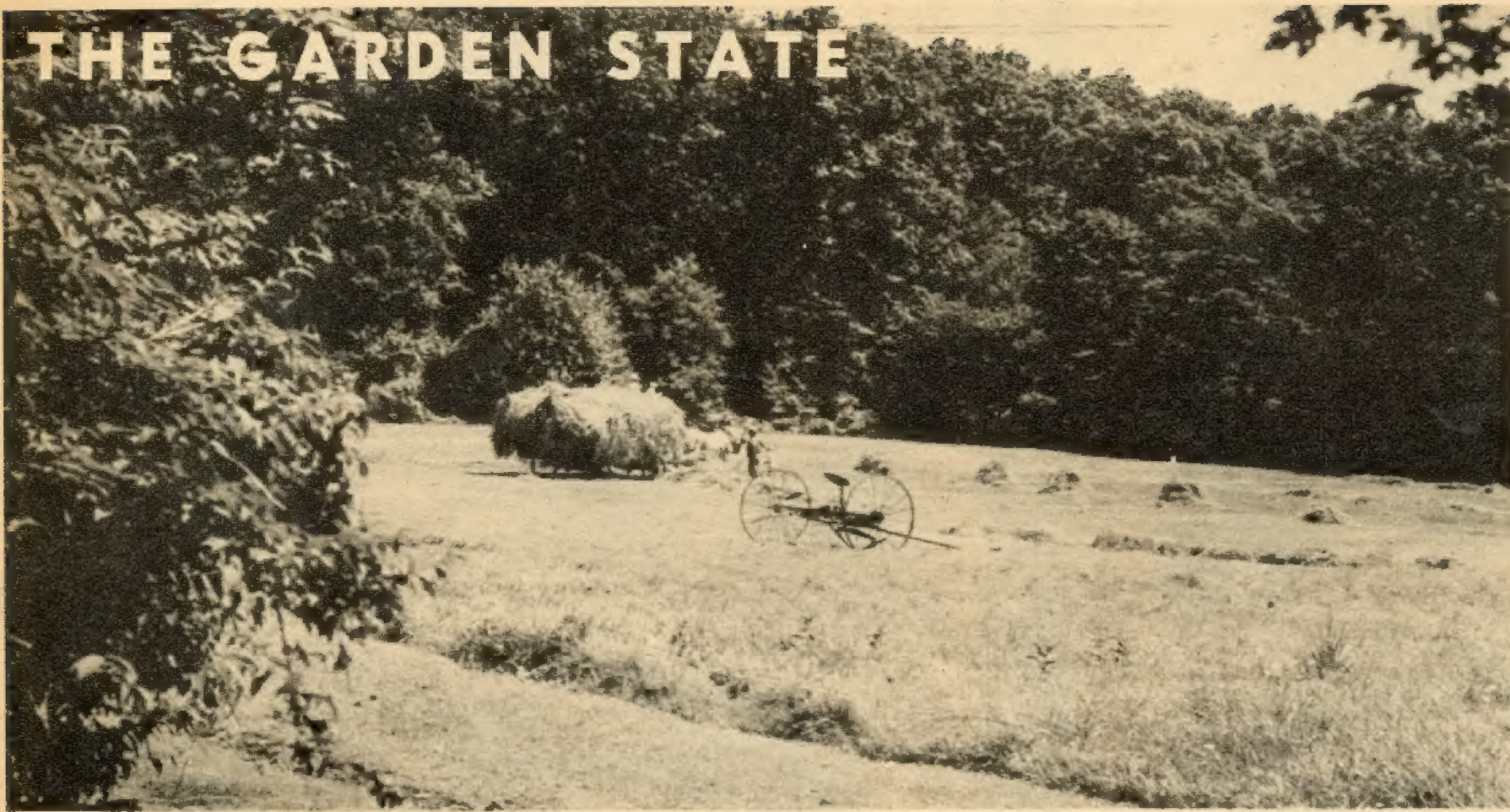


THE GARDEN STATE



Most haying operations are highly mechanized but the old horse-drawn "rick" can still be seen in field near Martinsville on south slope of Second Watchung range. BELOW: Wheat bursting with ripeness at harvest time in a Hunterdon County field.



HAY and grain typify agricultural well-being—symbolized in the picture of wheat billowing softly in a late June breeze, of a combine on a mountain slope, of the green pastures found in dairyland. Hay and grain bring back happy memories of boyhood on the farm—memories of bees buzzing in a clover field, of the click of a mower in the stillness of a hot summer day, of the sweetness of an alfalfa meadow.

More practically, hay and grain mean dollars down on the farm; at least \$40,000,000 annually to New Jersey farmers, and, as they say in the city, that ain't hay. Even to those who know New Jersey best, it always comes as a surprise to realize that 600,000 Garden State acres still are devoted each year to hay and grain.

Here's what 600,000 acres are: It all the hay and grain grown in New Jersey were in a single field, the boundaries would encompass the entire counties of Essex, Bergen, Hudson, Union and Passaic, with half of Morris thrown in for full measure. Moreover, the state's hay and grain fields occupy 13 times the area occupied by all industry in New Jersey—or enough land left over for 1,200,000 home sites (if the developer generously gave half-acre plots).

GRAIN alone occupies some 340,000 acres of land in the state—190,000 acres of field corn, 80,000 acres of wheat, 40,000 acres of oats, 20,000 acres of barley, 10,000 acres of rye. So the line about "amber waves of grain" in "America the Beautiful" applies to New Jersey as well as the Western plains. As for hay, New Jersey farmers make so much of it while the sun shines on 260,000 acres that the state's hay stacks up to more than 450,000 tons of livestock fare per year.

This is the ninth in a series of articles on New Jersey's highly diversified agriculture, vigorous and growing despite the constant inroads of industrial and residential development. Next week: Tree fruits.

BILL of FARE for LIVESTOCK

*Hay and Grain Grown by Jersey Farmers
on One-Eighth of State's 4,800,000 Acres
Account for More Than a Third of the
\$110,000,000 Spent Each Year for Feed*

By JOHN T. CUNNINGHAM

It is somewhat easier to measure the quantity produced than the dollars returned, since nearly all Jersey-grown grain and hay is grown to feed directly to livestock on the farm rather than for sale in the open market. This is tremendously important, since New Jersey farmers every year spend \$70,000,000 or more for feed over and above what they can grow. It follows, therefore, that the New Jersey acreage in hay and grain almost exactly overlaps the state's livestock regions.

Nothing has deeper agricultural roots than the growing of these field

crops, and New Jersey's grain heritage goes back to the days when the state made up a vital part of America's grain belt. It goes all the way back to the first colonists who learned from the Indians how to grow corn, back to the 17th century Swedish settlers who grew quantities of rye and barley in Gloucester County (rye for bread, barley for beer).

WHEAT surpassed all farm ventures by 1725, in the days when most grain went for human consumption; by 1750 New Jersey, New York and Pennsylvania were acclaimed as the "three bread colonies." Hunterdon County ruled supreme as "the most plentiful wheat colony for its bigness in America," and many a hand made dough from Hunterdon grain.

Naturally both American and Brit-



Combine at work in field near Sparta, Sussex County, part of state's 340,000 acres of grain.



BELOW: Getting ready to plant oats at Sea-brook Farms in Bridgeton, Cumberland County.

Huge new grain storage silos of Grange League Federation, cooperative farm supplier at Bordentown. Walter Angelow (below), elevator supervisor, checks wheat grown on Burlington farm of E. H. Shinn & Son, upon transfer from truck to grain bin at GLF.



ish armies foraged freely in New Jersey grain fields and storage bins during the Revolutionary War, but the most lasting impact of the Royal Army come not from its thefts in the granaries. Rather a tiny fly carried unwittingly to this country by the British Army's hired Hessian soldiers came in the passing years to be the worst enemy of wheat fields. The Hessian fly appeared first in New Jersey in 1783, spread far and wide by 1786, and even in 1955 the colonial insect forager continues as a threat to wheat fields sown too early in the fall.

The winged Hessian invader had allies in the farmers themselves, whose wretched cropping practices formed a virtual agricultural Fifth Column and limited wheat yields to as low as six bushels per acre. Only high prices, not good farm management,

kept wheat—or any grain for that matter—in the fields of Jersey.

GRADUALLY farmers learned the hard lesson that even the best of soil couldn't go on year after year without enrichment. By 1850, though, increasing uses of marl and lime improved the yields of all grain fields. Farmers planted more and more acres as they recognized the happy all-purpose uses of grain—to make bread, to make buckwheat cakes, to feed cattle, to fatten hogs, to sell in the open market at good prices. All that, and a jug or two of corn likker in the barn, too, nature and the farmer's wife willing.

New Jersey, along with southeastern Pennsylvania, Delaware and Maryland, made up America's corn region in 1840; New Jersey's 1,666,000 bushels of rye in 1840 made it the third rye state in the land. Never-

theless, any farmer threshing about for a good livelihood put all possible emphasis on wheat in the 20 years before the Civil War.

Wheat made the Raritan River one of the three most important streams in America between 1830 and 1850. In threshing time long lines of wagons rolled from Warren, Hunterdon, Sussex and Somerset counties to load wheat on New York sloops tied up in New Brunswick. More than 300,000 bushels of wheat went over the Brunswick wharves in 1830 and within the next 20 years the total of wheat lugged to the banks of the Old Raritan often exceeded 1,000,000 bushels in a single year.

Higher and higher rose all grain reapings. Oats reached a peak year in 1867, when 301,273 acres gave up 6,600,000 bushels of horse fuel (not to mention morning mush). Rye hit an

all-time high in 1868, when 159,000 acres yielded 1,350,000 bushels of potential rye bread (plus many a nip of blended spirits). Buckwheat hit a high of 877,000 bushels in 1859, in the era when breakfast without buckwheat cakes was less common than divorce. Corn acreage rose to 425,000 acres in 1880, making ears the biggest part of the state's grain anatomy and filling 14,000,000 bushel baskets. Wheat in 1878 covered 208,000 acres, sending 2,497,000 bushels of grain to the makers of the staff of life.

ALL this bounty threw the problem of farm labor into sharp focus, as boys and young men came to prefer the relative ease of factory life, where a body could make a living and only work 70 or so hours a week—and no chores on Sunday. Not even the cheer

(Continued on Following Page)



JERSEY HAY AND GRAIN

(Continued From Preceding Page)

of a husking bee dimmed memories of calloused hands and aching backs.

Particularly at grain harvest time did labor worry farm owners. Once any number of hands could be recruited to sweep up and down the rows in spirited competition, cutting with sickle or scythe and shocking by hand. Once any number of strong arms could be found to thresh the ripened grain. Once harvest time meant gaiety and laughter and profit along with the hard work (with profit and hard work being split about 50-50—profit to the farm owner, hard work to the hands).

Machinery had to be the answer. As early as 1802 a hand-powered thresher appeared on the market, followed in 1835 by a horse-powered thresher, and finally after the Civil War by huge smoke-belching steam-driven monster threshers. By 1850 a grain drill had become widely used, permitting better and quicker seed planting.

AS FARMERS sowed they had to reap, and as sowing practices improved, hand-scything couldn't keep up. Two Jerseymen, Richard French and J. T. Hawkins, invented a crude reaper in 1803. Dozens of other New Jersey inventors patented small parts of reapers and harvesters between 1800 and 1860, most of their contributions forgotten in the historic rush to grant Cyrus McCormick all credit for mechanized grain harvesting.

William Manning of Plainfield, for example, patented a reciprocating cutting knife in 1831, the forerunner of all successful grain cutters. But McCormick's reaper, patented in 1834, and his subsequent development of the binder won him a niche among the greatest inventors of all time—an earned niche, true, but one which unfortunately has obscured the fact that the reaper was not one man's inven-

tion but rather the combining of scores of small inventions.

Thus, the man with the scythe moved on and the reaper took his place. The reaper opened up the vast grain fields of the West, and as those fields took on the hues of golden wheat the demand for New Jersey grain declined. Garden State wheat acres declined to 132,000 in 1899, to 53,000 by 1929. At the same time, the horseless carriage made the steed more noble than needed—and helped cut the state's oat production to 75,000 acres by 1899, on down to 32,000 acres in 1929.

Other grain fields disappeared, particularly after intensive vegetable gardening for city markets took over more and more land. Corn acreage dropped from 295,000 acres in 1899 to 169,000 in 1929; rye acreage plummeted to 68,000 in 1899, to 31,000 in 1929. Even the widely admired Sussex County buckwheat flour industry succumbed as buckwheat acreage declined to 15,000 acres in 1899 and to 1,300 acres in 1929.

MEANWHILE, farmers gave increasing attention to livestock feed, or forage, as they have ever called it. Forage came naturally as a word for livestock feed, since in colonial days cattle and hogs literally foraged for food—chewing a salt marsh cud in the lowlands near the shore and lower Delaware River, chomping a considerably more green but no less casual fare on the slopes of the uplands. During the winter they subsisted on hay tossed up on stacks in the fields.

Miss Bossy didn't give much winter milk on that diet, but it didn't really matter until the 1870s, when New Jersey first started to become an important commercial dairy state. As city milk markets increased, farmers began to pay attention to what they set before the cow at chow time. They began to seek methods to improve their pastures, to better their hay, to provide something more nutritious and delicious than dry hay in the months when drifting snows covered the pastures.

Had the farmers been listening through the years they would have

been better off. John Reid of East Jersey, one-time gardener to the Lord Advocate, sent home for "great clover seed" in 1684. If Reid ever grew "great clover" the notion didn't catch on; why waste money on a Scotsman's whim when cattle fared all right (they stayed alive, at any rate) on ordinary meadows.

A CENTURY later two Revolutionary War colonels, George Morgan of Princeton and John Stevens of Hoboken, talked up a new field plant called alfalfa—Morgan in 1785 sold seed, Stevens in 1794 called alfalfa a "noble plant" and predicted great things for the sweet-smelling green. Again, few heeded the colonels, although in fairness it should be pointed out that it took decades of research to show that alfalfa couldn't be grown profitably without special soil treatment.

Long before the Civil War an increasing number of farmers began sowing timothy and clover in their fields—thus "taming" the wild pasture and hay fields. Clover was preferred for cattle, timothy for horses. Enough New York and Philadelphia horses (not to mention those in Newark and Trenton) liked New Jersey timothy well enough to make it feasible to send huge shipments through the Morris Canal, up the Delaware and Raritan Canal and over the spark-throwing railroads which cut through the hay lands between New York and Philadelphia.

But the automobile brought baleful news to the hay and straw men—whether they grew timothy or clover or just plain meadow grass; the day of the hay-and-oat-burner had passed except for those horses which ran in circles for the improvement of the breed. These caused more excitement than good old pullers of brewery wagons and moving vans, but they didn't eat nearly as much hay or oats.

So, as the Kaiser's war machine rumbled over Europe and pulled in America in 1917, the growers of grains and hay faced a sober realization that no longer would New Jersey grow much grain for human consumption and no longer would city horses

Ensilage is blown into truck by tractor-hauled combination corn cutter and chopper. — Hand labor is eliminated even to vacuuming load in silo.

bring a farmer a bundle in return for timothy or clover.

THE war brought back the good old grain days in fleeting moment. All grain puffed from 1916 to 1919. Corn rose to 337,000 acres and war-inflated prices brought in a cool \$21,000,000 as New Jersey farmers stalked that corn trail. Wheat brought \$3,000,000 or more annually every year between 1917 and 1920, oats meant \$2,496,000 in 1918 and even rye had a spirited World War I rebirth. Hay brought \$28 or \$29 per ton, bringing in a sweet \$13,700,000 in 1918—a year when horses gained renewed stature as they tugged gun carriages through European mud.

Actually, hay requirements stayed way up all the way from 1875 to 1920, horses or no, since as horses fell by the wayside more dairy cows appeared on upland farms. Seldom, in that entire stretch of nearly 50 years, did hay production fall under 500,000 tons in a year, often it soared close to 700,000 tons.

Farmers, like their brothers of Wall Street, gaily fed and watered their stock through the allegedly prosperous Twenties and grain and hay stayed at high bushel and dollar levels in the state. Even before Wall Street tumbled in 1929, however, prosperity on the farm had long since turned the corner it was just around—and had gone the other way. Grain prices sagged distressingly, down to the all-time low of 59 cents a bushel for wheat in 1931, and stayed down almost to World War II.

EVEN as grain prices dipped, farm researchers delved into the mysteries of grain life, particularly hybrid corn. Here the grain world listened respectfully to a modest Princeton University professor of botany and genetics—Dr. George Harrison Shull. Dr. Shull came to Princeton in 1915, a decade after he started hybrid corn experi-

ments at Cold Spring Harbor, L.I. (and stayed in the university town until his death last fall).

At least a half dozen botanical geneticists are credited with major contributions to the development of hybrid corn. Among these, Dr. Shull rightfully became known as the "father of hybrid corn." His hybrids, tailored to meet widely varying soil or climatic conditions, have been a major boon to farmers everywhere. Yet, hybrid corn seed was not produced commercially until 1922, when Henry A. Wallace (later Vice President of the United States) organized the Hi-Bred Corn Co. Mr. Wallace had worked on hybrid corn as early as 1907.

Scientists at Rutgers Experiment Station began the search for corn hybrids specifically for New Jersey use in 1923, although their first varieties (labeled simply "No. 2" and "No. 4") didn't become established until 1935. Many farmers hesitated on hybrids, preferring the old varieties with their tall stalks and big ears. It took some fancy talk—and some hard showing of facts—to get hybrids established at all, but by 1940 more than 30 per cent of all field corn was hybrid. Today, close to 95 per cent of all New Jersey field corn is of a hybrid variety.

ALONG with the planting of hybrids, corn farmers heeded suggestions that they use more fertilizer and after 1940 began following instructions to seed more plants per acre. Now, despite the fact that hybrid ears are about 40 per cent smaller than the old standard varieties, New Jersey farmers are averaging 50 to 55 bushels per acre (compared with 35 to 38 bushels in 1935). Many a farmer goes well over 100 bushels per acre, a few top 150 and last year a yield of 187 bushels per acre was reported.

Corn is far and away the biggest grain item in New Jersey today, with 190,000 acres planted—about 140,000 of that for the kernels, another 40,000 for silage and the rest for miscellaneous uses. Corn is a husky item, and it can mean anywhere from \$16,000,000 to \$18,000,000 per year in New Jersey. It isn't hard for any farmer to lend an ear to such a jingling cash register tune.

Wheat, admittedly aided by the greatest farm invention since McCormick's reaper—the government price support—is a vital item in the Garden State. More than 80,000 acres spread over the state, particularly in Middlesex, Monmouth, Mercer, Salem, Burlington, Somerset and Hunterdon counties—some of those acres on land once hallowed as white potato territory. New Jersey farmers are affected by grain price supports in somewhat reverse fashion; as prices for Western grains mount, New Jersey livestock men seek to plant more and more wheat. Harvested in July, the state's wheat crop hits some 2,000,000 bushels annually, worth upward of \$4,000,000. It is intriguing to learn that New Jersey now grows about as much wheat as it did back in the supposedly halcyon days just after the Civil War.

Other grains are important. More than a million bushels of oats are harvested annually in the state and occa-

sionally that soars to more than 1,500,000 bushels. Barley is an example of a grain coming back into importance. Barley had declined by 1910 to about 200 acres in the state, during the 1930s a state total of 1,000 acres was about average. Now, thanks to some new winter hardy varieties, New Jersey has 20,000 acres in barley, yielding close to 700,000 bushels per year.

Grains have a value over and above the dollars they bring, since they fit in nicely with a farmer's rotation program. A rotation of corn this year, oats next year, followed by a couple of years of alfalfa before going back to corn again, is good for the fields. Potatoes can be alternated with wheat and soybeans to keep both the farmer's bank balance and his soil in good condition.

Going from corn to oats to alfalfa also serves to transfer attention from grain to hay and to forage crops in general. Hay is worth \$16,000,000 annually in New Jersey, particularly because of alfalfa, far and away the most important hay crop in the state. Alfalfa is a child of the 20th century, as far as New Jersey is concerned, despite the early efforts of Colonels Morgan and Stevens.

SPECIAL soil conditions and hardy varieties have contributed to alfalfa's rise in the state—from 190 acres in 1900 to 22,800 acres in 1925 and to nearly 80,000 acres today. As alfalfa has gone up, timothy and clover have gone down from a peak of 307,000 acres in 1909 to about 12,000 acres today. But it all winds up as hay, except maybe the early cuttings in late May or early June—which may become grass silage.

Grass silage is no longer a controversial item (except between the farmer, who says it doesn't have much of an odor, and the farmer's wife, who says it's far from being as sweet as a fresh clover blossom). Grass silage is based in large measure on experiments started at Rutgers in 1935, although earlier experiments in Kansas dated back to 1917. A preservative—molasses, for example—is mixed with chopped grasses or clover or alfalfa and put in the silo, once the eminent domain of King Corn alone. Experts say it's good feed and cattle (experts themselves on their gustatory preferences) seem to like grass silage and to thrive on it.

HAY might seem like the most natural thing in the world, but it isn't any more. Indeed, a big farm story in the last 30 years has been in the increased use of alfalfa plus the increased use of new clover varieties and new types of grasses to improve on nature. Mother Nature, it seems, doesn't always know best as far as hay fields are concerned. Ladino clover, a giant white clover, is today the state's most important pasture clover, yet it has been grown extensively here only about 20 years. Bromegrass, virtually unknown in New Jersey before 1940, is in 1955 a vital hay and pasture grass.

The uses of grain and hay to keep livestock reasonably happy and unquestionably well fed from November to March are allied to another excep-



Combine working in oat field at Ideal Farms, Augusta. Jersey's annual oat harvest from 40,000 acres averages one million bushels.



Feeding hay, worth \$16,000,000 annually in Jersey, to Sussex County dairy cows during 1954 drought, when pastures burned in hot sun.

tional story—the improvement of New Jersey's pastures since World War I.

Increased plowing and seeding of pasturelands, greater uses of manure and fertilizers, and widespread seeding of new grasses and clovers have all combined to make New Jersey's pastures greener and richer than ever. Farmers once had to be educated to "made" pastures, but a smart dairy farmer no longer questions such improvement on what God gave him in the way of meadows or hillsides for grazing. God helps them as helps themselves in the pastures, too.

By planting different grasses in the same field and by rotating his feeding areas, a dairy farmer can put his cows out to spring pasture as much as three weeks earlier than ever before, provide better grazing all summer and can keep them out three weeks longer in the autumn. That means he saves six weeks of feeding high-priced grain and silage. Rotational grazing saves on the feed bill, pays off in better milk production and means less wear and tear on pastures.

Grains and hay and pastures are basic to good livestock farming; live-

stock must be fed if there's to be any milk in the cow or any bulk in the porker. Feed costs money; the more of it the Jerseyman can grow or graze the closer he comes to staying even with farmers in regions blessed with broad acres of cropland.

THERE'S an old story of a 19th century New Jersey farmer who sat down and figured out that the grain he was putting into a hog for winter family use cost him \$75, whereas he could bring in a pig from the West for \$65. He sold his pigs, sold his grain in the market. A year later a friend asked him how it worked out. "Well," said the farmer, "I sold my pigs and I sell my grain, but somehow I never get \$65 together to buy a pig, so now I have neither grain nor pork."

The moral, of course, is that the best way to make profit on hay or grain in this area of the country is to put it into a cow or a hen, a steer or hog—then sell the milk, the eggs, the beef or the pork.

New Jersey farmers are doing that; their only regret is that they can't do more of it.